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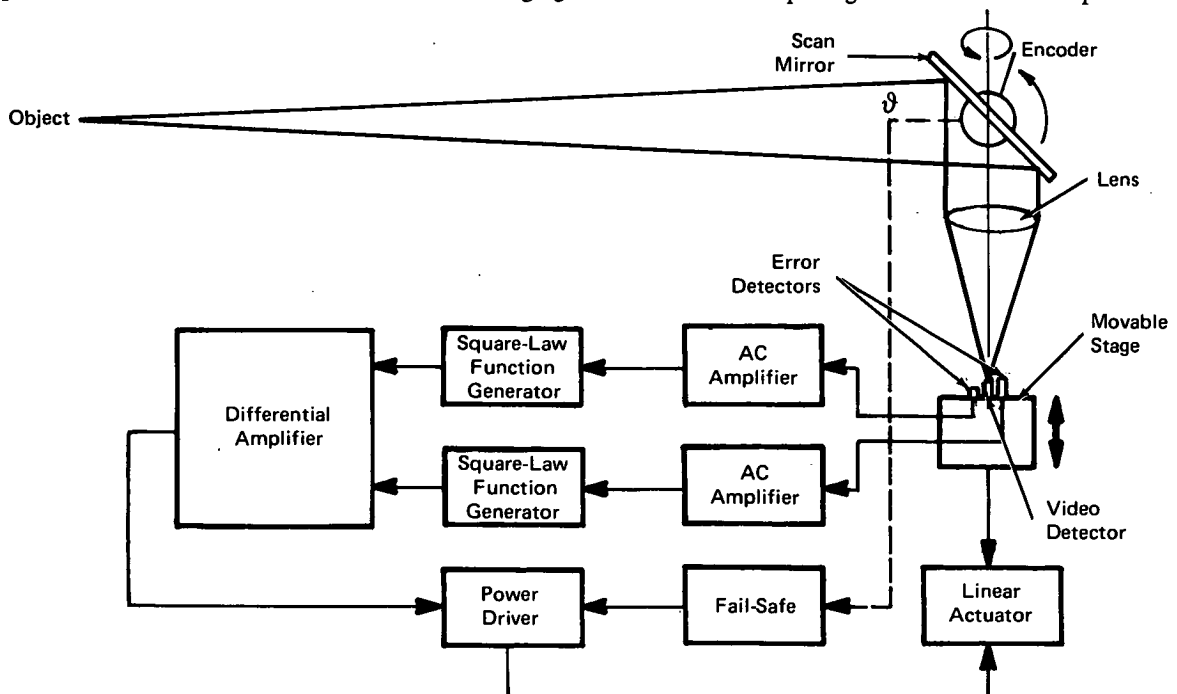
Automatic Focus Control for Facsimile Camera

This automatic focus control performs the function of automatically focusing a facsimile camera throughout an object field being scanned. It does this by determining the correct focus point for objects, as they are scanned, and adjusting the focus of the imaging sensor accordingly. Since the facsimile camera images a scene by scanning discrete strips, it is possible to have the entire three-dimensional scene in perfect focus at the point of imaging by use of this automatic focus control.

The basic components of the automatic focus system are schematically shown in the illustration. They consist of a movable stage, containing two photodetectors for sensing and one or more imaging sensors, which is connected to an electromagnetic linear actuator and the electronics equipment. The two focus detection sensors are placed with one closer to the lens than the imaging

sensor, which produces the video data in the fashion standard to facsimile cameras, and the other farther away. The actuator is similar to a common speaker voice coil; and the primary actuator is driven by an error signal, which is the difference in focus sensor outputs. The electronics equipment consists of balanced ac amplifiers, two square-law function generators, a differential amplifier, and a power drive.

The two facsimile-camera focus sensors scan a line of a three-dimensional scene, with the first slightly before and second slightly behind the imaging sensor, and have a field of view equal to that of the imaging sensor. As the focus sensors scan, they receive varying light intensities and produce signals which may be equal or normally different. The fail-safe circuit is included because of the equal signals which would be produced by



Basic Components of the Automatic Focus System

(continued overleaf)

the focus sensors looking at a blank wall or shadow; by use of the secondary actuator, this circuit prevents excessive excursions in the primary actuator servo when true video is reacquired. When the scan produces the normally different signals, the signal from the detector in best focus will show the most ac components. The signals are passed through the ac amplifiers to drive separate function modules, which square the individual signals. Each signal is then filtered and applied to inverting and noninverting inputs of the differential amplifier. The output (signal difference) drives the input of the power driver and primary linear actuator. The servo drives the actuator until there is equal signal from each focus sensor. The imaging sensor, mounted on the movable stage at the calculated focus point between the focus sensors, is then in focus.

Note:

Requests for further information may be directed to:
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Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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